ANTI-GLARE VEHICULAR MIRROR

BACKGROUND OF THE INVENTION

The present invention relates to mirrors for school buses, trucks, vans or any vehicle and, in particular, mirrors for school buses which are mounted on the front of the buses and which are glare resistant while still providing large fields of view.

For decades, it has been known to fit school buses with mirrors mounted on the front fenders which provide very wide angle fields of view, enabling the bus drivers to carefully monitor the bus along the front and sides thereof. Providing such mirrors is necessary as a matter of the safety of our children.

Typically, such mirrors are spherical or nearly spherical in shape. Many are dome shaped, to achieve the wide field of view.

These mirrors are very well known in the art, as exemplified by the 1933 U.S. Patent No. 1,905,623 to Deitz. Similar mirrors are also disclosed in United States Patent Nos. 4,436,372; 4,512,634; 5,005,963; 4,500,063; 4,938,578 and many other similar patents. The contents of the aforesaid patents are incorporated by reference herein.

While the mirrors of the prior art achieve their intended objectives of providing wide fields of view both in the horizontal and vertical (azimuth) directions, there are certain drawbacks to their use. Specifically, the inventor herein has determined that the provision of wide fields of view along the azimuth direction sometimes adversely affects the optimization of the operability of the mirror system.

Other prior art, dealing with the subject matter of vehicular mirrors and the subject of undesired light reflection, includes U.S. Patent Nos. 1,311,253, 1,811,823; 2,514,989; 2,881,655;

3,764,201; 4,822,157; 5,589,984, as well as WO 8503136 dated July 1985 and German Patent 2148022 dated March 1973. The contents of the foregoing U.S. patents are incorporated by reference herein.

SUMMARY OF THE INVENTION

In accordance with the present invention, a portion of the mirror's surface is treated to reduce or eliminate glare. Specifically, in accordance with the present invention, the mirror's surface is notionally divided along the azimuth vertical direction into several zones. To obtain the maximal glare reduction, the top one half portion of the mirror is treated for reducing glare. Preferably, however, only the top one-third portion is so treated, in order to minimize the surface area which shows a darker or duller image due to the anti-glare treatment. Thus, an image is still visible although in a darker which reduces possibly disturbing or confusing glare.

The methods of fabricating and/or treating mirror surfaces to reduce glare are well known in the art. For example, there are non-glare coatings that can be applied to the mirror surface. Another approach is to adhere a cellophane based thin membrane shield or cover over a portion of the mirror surface. Still another approach involves a chroming process to reduce glare. That is, a chrome plating is applied on the front surface of the mirror glass.

Other features and advantages of the present invention will become apparent from the following description of the invention which refers to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective of a typical prior art wide angle spherical mirror attached to a school bus.

Figs. 2A, 2B and 2C show front views of several spherical mirrors for school buses

which have been treated to reduce glare.

Fig. 3 is a cross-section along the line 3-3 in Fig. 2A.

Fig. 4 shows a further placement of anti-glare treated areas on a oval shaped surface of a convex mirror.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

With reference to Fig. 1, a mirror element 10 is affixed to a mirror pole 12 which is in turn received in a mirror mount 14 by which the mirror 10 is thus secured to the front fender 16 of a school bus 18. The mirror element 10 is generally dome shaped (Fig. 3), but can have a variety of peripheral edge shapes, for example, circular as shown in Fig. 2A, horizontally oval as shown in Fig. 2B or vertically oval as shown in Fig. 2C. The depth of the dome relative to the base 20 (Fig. 3) of the mirror 10 can be selected to choose different angles of view, as is well known. Also, as is known in the art, the mirror element 10 can have one field of view in the horizontal direction (denoted by the arrows 22 in Figs. 2A and 2B) and a different angle of view in the vertical direction as denoted by the arrows 24. The angle of view magnitude is determined by the radius of curvature of the mirror surface in the horizontal and vertical directions.

An occasional problem which has affected spherical mirrors of the type indicated is the possibility of reflection of the sun rays from the upper half of the mirror element as indicated by the arrows 26 and 28 in Fig. 3 when the mirror is not optimally mounted.

~~This persistent and long standing problem which has been largely ignored by the prior art has now been recognized by the inventor herein who has conceived a simple yet elegant solution thereto.~~

In accordance with the present invention, one can view the mirror element of Figs 2A, 2B

and 2C as having a surface which extends vertically from a highest point at position 30 to a lowest point at position 32. The sun rays reflection problem is solved by treating a portion, specifically the upper portion of the mirror surface with an anti-glare material, in any of the manners well known in the art, as set forth in the summary of the invention section of the present description.

With reference to Fig. 2A, in the broadest application of the present invention, the treated surface encompasses that portion of the mirror element surface 10 which begins at the uppermost position 30 and continues to about halfway down the vertical direction, to the line which is identified by reference numeral 34. In a mirror element fabricated so that the upper one half portion of the dome surface is treated for glare, the image in that portion will be darkened because of the glare treatment. It is important not to increase the portion treated with anti-glare material beyond the bottom one half portion because the glare treatment reduces the sharpness of the image and it is important that the lower half mirror which points to the front of the bus where very young, short children may be standing is not affected.

Preferably, however, it is sufficient for reduction of the glare problem if only the top one third of the mirror surface is treated with the anti-glare material. In this preferred embodiment, only the surface above the curved line identified by reference numeral 36 (in Fig. 2A) is covered with the anti-glare material. Note that the line 36 is curved relative to the straight surface bisecting line 22.

In the foregoing description, the surface of the reflecting mirror, which has been treated for reducing glare, always had a portion which bordered the peripheral circumscribing edge of the reflecting surface. The peripheral edge is the circumferential edge 50 of the reflecting surface. However, turning to Figure 4, the invention also encompasses applying onto the surface of the reflecting mirror an island of anti-glare coating selected specifically to deal with any location on

the mirror surface from which the undesired reflection may emanate. This area is shown in Figure 4, as area 52, but that area can be in any of the other quadrants or may be larger than as shown or may straddle several quadrants. The consideration is always to ensure that the area or island that has been treated with anti glare material, is located away from the peripheral edge 50 of the reflective surface. There is a logical reason to proceed with the approach of Figure 4. That is because the image is rather smaller near the mirror edges, and one would not want to miss the image of a child reflected near the circumferential edge 50 of the mirror surface due to dulling of the image. Also, it is perceived that one would typically not encounter undesired reflection near the edges.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.